

REPORT OF 1930 FOREST INSECT SURVEY OF THE COEUR D'ALENE
NATIONAL FOREST

by
T. T. Terrell

INTRODUCTION

During the summer of 1929 a survey was made of the white pine stands of the Coeur d'Alene National Forest to determine the status of the mountain pine beetle (Dendroctonus monticolae) infestation. Previous to this survey a small project had been instituted on the west fork of the Steamboat Creek drainage, and it was feared that comparable conditions existed on many other adjacent areas. As a result of information secured during the 1929 survey it was found that such conditions did exist, and an appropriation of \$150,000 was secured for the institution of control measures in the spring of 1930. The resulting project was the largest ever organized to combat a bark-beetle outbreak, and 23,119 trees were treated at a cost of \$123,360.73. Following this project an allotment of \$2,500 was set up for the purpose of making a survey of the area treated as well as the adjoining areas where no control was carried on. The purpose of this survey, which was under the direction of the Bureau of Entomology, was to determine the result of the control work as well as to secure an estimate of the 1930 infestation upon which to base recommendations for a maintenance program of control.

The standardized sample strip method of insect survey developed by the Bureau of Entomology was used during this survey. Sample strips one chain in width were run through the infested pine stands on a general

compass bearing. Each man works alone, pacing the distance covered, and from the center of his strip counts the infested trees which are recorded for every ten chains traversed. These strips are continuous, and in white pine type from four to six miles can be run during an average man day. The Forest was divided into thirty-two camp units, each having from one to five or six thousand acres of white pine type. In areas of heavy infestation strips were run about twenty chains apart; while in regions of light infestation and areas of scattered pine a more extensive survey was made. The areas of commercial timber, as shown on the type maps available, are not adapted to the basing of an acreage figure on which to apply the data secured from the sample strip, and notes were taken relative to the timber types and they were classified according to the amount of pine per acre.

SUMMARY OF THE 1930 SURVEY BY UNITS

The following tables show the present status of the mountain pine beetle infestation of the Coeur d'Alene National Forest:

BLAINE HAVEN DISTRICT

Coeur d'Alene Forest

Area	Acreage Treated (1930)	Acreage Surveyed (1930)	Trees Treated (1930)	Infestation (1930)	Per Cent of Decrease	Trees per Acre (1930)	Control Recommended	Funds Required
Forks	1,240	1,240	259	136	47	.110	Yes	850
Tom Levin	3,150	3,150	950	284	70	.090	Yes	1,700
Ivan Creek	3,240	3,240	635	192	70	.050		
Cathcart Dam	3,440	3,440	1,103	215	81	.063		
Harney Creek	880	880	121	None	100	.000		
Cascade	3,680	3,680	1,295	287	78	.078	Yes	1,700
Pionic	None	1,360	None	163	--	.120	Yes	1,000
Honeysuckle	2,880	4,160	550	191	65	.046		
Delany	None	3,200	None	96	--	.030		
Linburg	3,820	3,820	728	206	72	.044		
Leiburg	2,300	2,300	136	120	9	.052		
Levin Creek	None	3,880	None	209	--	.044		
Breakwater Dam								
TOTAL	25,230	34,950	5,177	2,099	64	.060		5,250

GRIZZLY MOUNTAIN DISTRICT

Coeur d'Alene Forest

Area	Acreage: Treated: (1930)	Acreage: Surveyed: (1930)	Trees: Treated: (1930)	1930 Infestation	Per Cent: of Decrease	Trees per: Acre: (1930)	Control: Recommended	Funds Required
Taylor's Camp	2,240	2,240	402	100	75	.045		
Forks-Cabin	5,120	5,120	1,150	354	69	.069	Yes	2,100
Can Creek	1,760	1,760	594	579	24	.304	Treated fall 1930	
West Fork	2,880	2,880	653	130	80	.045		
Clay Creek	2,440	2,440	513	150	71	.061	Yes	900
Lower Cougar Creek	2,560	2,560	292	150	49	.059	Yes	900
Upper Cougar Creek	No Control	4,480	No Control	170	--	.038	Yes	1,000
Bumblebee	No Control	1,900	No Control	158	--	.083	Yes	1,000
Total or Average	17,000	23,380	3,604	1,791	50	.077		5,900

SHOSHONE DISTRICT

Coeur d'Alene Forest

Area	:Acreage:	Acreage :	Trees :		:Per Cent:	Trees per:		
	:Treated:	Surveyed:	Treated:	1930	: of :	Acre :	Control :	Funds
	: (1930):	(1930) :	(1930):	Infestation:	Decrease:	(1930)	:Recommended:	Required
Sissons	: 3,720 :	4,000 :	2,135 :	1,100	: 48 :	.275 :	Yes	7,000
Yellowdog R.	: 2,280 :	2,280 :	2,352 :	366	: 54 :	.161 :	Treated Fall: 1930	
Yellowdog	: 2,880 :	2,880 :	1,111 :	397	: 64 :	.138 :	" "	"
Downey Creek	: 2,560 :	2,560 :	1,208 :	624	: 48 :	.244 :	" "	"
Flat Creek	: 2,400 :	3,200 :	711 :	403	: 43 :	.126 :	Yes	2,500
Rock City	: 2,260 :	2,260 :	1,030 :	235	: 77 :	.104 :	Yes	1,300
Cinnamon	: 1,360 :	1,360 :	407 :	155	: 62 :	.114 :	Yes	900
Eagle Creek	:No :		:No :					
East Fork	:control:	1,640 :	:control:	150	: -- :	.091 :		
Eagle Creek	:No :		:No :					
East Fork	:control:	3,520 :	:control:	200	: -- :	.057 :		
Big Creek	:No :		:No :					
(Hask)	:control:	4,040 :	:control:	396	: -- :	.098 :	Yes	2,400
Big Creek	:No :		:No :					
(Cabin Creek)	:Control:	6,500 :	:Control:	572	: -- :	.088 :	Yes	3,500
Total or	: :		: :					
Average	:17,460 :	34,240 :	8,954 :	4,598	: 49 :	.134 :		17,600

WAGNER DISTRICT

Coeur d'Alene Forest

Area	Acreage: Treated: (1930)	Acreage: Surveyed: (1930)	Trees: Treated: (1930)	1930 Infestation	Per Cent: of Decrease	Trees per: Acre (1930)	Control Recommended	Funds Required
Big Elk	2,400	2,400	738	100	86	.042		
Big Elk	2,560	2,580	425	100	76	.035		
Potter Creek Upper	1,680	1,840	1,065	127	88	.069	Yes	800
Potter Creek Stewart	1,920	1,920	1,241	353	71	.184	Yes	2,200
Creek	2,000	2,000	506	362	28	.151	Yes	2,200
Brett-Miner	1,120	1,980	193	51	74	.026		
Flat Creek	2,960	3,680	616	150	76	.041		
Total or Average	14,640	16,700	4,784	1,243	74	.074		5,200

COEUR D'ALENE, IDAHO
Summary of Districts

Coeur d'Alene National Forest

District	Acreage	Surveyed	Trees	1930	Per Cent of	Trees per	Control	Funds
	Treated	(1930)	(1930)	Infestation	Decr. age	(1930)	Recommended	Required
Little River	25,230	34,950	5,777	2,099	64	.060		5,250
Grizzly Mt.	17,000	23,380	3,604	1,791	50	.077		5,900
Shoshone	17,460	34,240	8,954	4,598	49	.134		17,600
Forks (Moose)	14,640	16,700	4,784	1,243	74	.074		5,200
Total or Ave.	74,330	109,270	23,119	9,637	58	.087		33,950

The survey started from the Honeysuckle Ranger Station August 4th, camp being first established at the junction of the Little Coeur d'Alene River and Iron Creek. From this camp three control units were surveyed: The Forks, Tom Lavin, and Iron Creek. The infestation in the Forks unit was found to be heavier than was expected. However, the higher proportion of new attacks found in this drainage can perhaps be explained by the late spring control work. A large per cent of the trees treated in this area had been felled the year before during trail construction. The broods within these trees were well developed toward the end of the treating season, and it is possible that a large per cent of the insects escaped destruction, as the peeling of the trees will not destroy the mature beetles.

The stands of pine found in the Tom Lavin drainage are infested to some extent. The mixed lodgepole type found in this area made a thorough clean-up one year a very difficult operation.

A large per cent of the timber from the mouth of Picnic Creek to the mouth of the Little Coeur d'Alene River has been logged off. On this logged off area there are from ten to sixty seed trees per section that are infested at this time.

The Bumblebee unit has a few spots of heavy infestation at the head of the drainage, and is one of the few areas on the forest where groups of infested trees were found. However, the pine stands of this drainage are small in extent, and only 158 infested trees are estimated for the entire area.

Cougar Gulch should be worked from two campsites instead of one, as was the case during the spring control project. The two heaviest areas of infestation in this drainage are located near the mouth and near the forks of Cougar Creek. The timber stands are similar to those of the Bumblebee drainage in that the white pine is usually found on the north slopes.

The heaviest area of reinfestation in the Steamboat drainage was found in the San Creek unit. This was partly due to the presence of a 1929 burn, which provided a quantity of attractive host material, and partly due to inefficient spotting during the spring control project. Other units of the Steamboat drainage found to be reinfested are the Forks, Cabin, and Clay Creek. The Forks-Cabin area is a two composite unit having one composite at the forks of Steamboat Creek and the other at the mouth of Cabin Creek. The Clay Creek camp covers the rest of the East Fork from Cabin Creek to the head. Two insect control projects have been conducted in these areas. However, they are still infested to the extent of .06 trees per acre. This reinfestation is thought to be due to inefficient spotting, especially in 1930. During the 1930 control work the chief spotters of these units were attempting to cover strips that were entirely too wide. Later in the season the trees that were missed were plainly visible; seventeen red-tops were counted in a small area approximately one-half mile square. Some of the best white pine stands to be found in Idaho are located in this drainage, and as the timber is practically all one type it seems to be very susceptible to the mountain pine beetle.

Following the Steamboat drainage, the east and west forks of Eagle Creek were examined. The white pine in these drainages are found along the creek bottoms. The hillsides are nearly all burned over or are covered with lodgepole pine and Douglas fir type. A few red-tops were seen but only one new attack was found and examined. In this region the white pine type was so scattered as to make a strip survey impracticable, so an estimate was made by examining the timber along the creek bottoms and counting red-tops.

The upper portion of the Big Creek drainage is about half burned off. A large per cent of the remaining timber is hemlock, with some pine along the lower levels. The heaviest infestation was found on the west side of Big Creek from Cabin Creek down, and extending from one-half to one mile back from the creek. Some scattered infestation was found on the east side, extending into the sub-alpine type near the top of the Idaho-Montana divide. Very few attacks were found on the strips in the Falls Creek drainage except near the junction of Falls Creek and Big Creek. At this junction there is a small area of young pine that is more heavily attacked than the rest of the drainage. From the Hawk Cabin it was found that the heavier infestation on the west side of the creek continued heavy on that side down the creek as far as the timber lasted.

Sissons unit, or camp number one on the main river, is badly re-infested. This was the first camp to go into operation in the 1930 control project, and consequently a number of spotters were trained at this camp, with insufficient instruction which resulted in poor spotting. Due to the size of the project very little time could be given to individuals and men were trained in groups wherever possible. In the course of training each spotter should be instructed in marking a number of trees having different characters of brood development. Some of the spotters trained at the Sissons camp were too young and did not take their work seriously. It has probably been over emphasized that young men were necessary for this type of work, and consequently boys not out of their teens were employed wherever possible. Some of these youths developed into very good spotters, and when they are inclined to be serious minded are undoubtedly better qualified than older men for this work.

The Flat Creek area was well cleaned up, but a 1929 burn of 360 acres became heavily infested this summer, making it necessary to consider the area in future control plans. The head of the Flat Creek drainage was treated from the Magee district, and a very thorough job was done. Brett-Miner and Big Elk were also successfully treated, having reductions of from 74 to 86 per cent in the infestation.

In the camp units of Stewart, Upper Potter and Lower Potter Creeks, more or less topographical spotting was tried. This method was not proven successful in the past, except when the terrain is especially adapted, and should not have been experimented with in these units. The tables show that in most cases the camps where this method was intensively used a much lower per cent of decrease was secured than in the camps where the area was covered by the 100 per cent spotting system.

The survey ended October 5th, after running 572 miles of sample strip, comprising 4576 acres. The data from this acreage was applied to nearly one hundred ten thousand acres of white pine type.

The following table gives a cost of the survey:

Transportation	\$ 52.75	Cost per mile of strip	\$.092
Subsistence	56.16	" " " " "	.447
Wages (men)	1190.68	" " " " "	2.080
Pack stock	366.00	" " " " "	.639
Total	\$1865.59		\$3.26
		Cost per acre of white pine type on forest (109,270)	\$.017
Total man days			247
Effective man days			137
Non-effective			110
Total miles of strip			572

Table (Continued)

Miles of strip per man day	2.31
Miles of strip per effective man day	4.17

In the above table the cost of some items seem to be out of proportion to others. The following brief explanation may show the reason for these differences.

Transportation: The camping equipment was ordered about ten days prior to the date set for the survey. A delay in the delivery of this equipment caused an expenditure of \$43.75 for special transportation to put the equipment in the field.

Noneffective man days: This item includes the packer, as all his time is noneffective; and as the men were paid on a monthly basis, Sundays were counted noneffective. About eighteen man days were lost on account of bad weather, and several days were spent on the long moves.

The personnel of this survey consisted of four companions and a packer. The packer also did the cooking, moved the equipment and kept the camp supplied with provisions requisitioned from the nearest ranger station. On short moves it was possible to run strips between campsites while the camp equipment was being moved around by trail. The party was equipped with five mules and a saddle horse. Feed for the stock was purchased whenever it was needed, but the cost for this provision was lessened through grazing. Six mules would have proved better than five, for often two or more trips were necessary to move the camp when mule feed had to be carried. The Coeur d'Alene Forest Office made arrangements for us to requisition supplies from the district ranger station. This was an important factor in the reduction of survey cost. Had it not been for the excellent cooperation of the Coeur d'Alene office and district rangers, the survey would have been more expensive and difficult to perform.

DISCUSSION OF COEUR D'ALENE PROJECT WITH RECOMMENDATIONS
FOR FUTURE CONTROL

By
J. C. Evenden

From the tables shown on pages 3 to 7 inclusive of Mr. Terrell's report, it will be seen that a marked variation occurred in the results secured from last season's control. Such variations are oftentimes difficult to explain, as when the same methods of control are used in adjacent areas it would seem that fairly comparable results would follow. To account for such variations consideration must be given to the possible flights of insects into or out of the units, the time of control, abundance of beneficial insects, as well as to the character of the spotting and treating. Though all of these factors must be considered, I feel sure that perhaps the most important of them all is the quality of the spotting, which practically resolves itself into a question of project personnel. With such large projects as the Coeur d'Alene the problems of personnel, or rather the lack of trained personnel, are the most difficult ones to meet. Untrained personnel, placed in positions of responsibility, can only result in poor accomplishments. During the course of the project men with no previous experience were called upon to not only act as chief spotters, but to train and supervise the work of their own crew as well. Though officers of the Bureau of Entomology spent as much time as possible with these men, in many instances only a few hours could be given to a crew before they were obliged to move on to contact another crew just starting. This condition, though un-

avoidable, was far from satisfactory, and could only result in a poor class of spotting. Furthermore, variations in the system or mechanics of spotting occurred from time to time that were ill advised and likewise productive of poor results. It must be appreciated that with projects the size of the Coeur d'Alene, or in fact nearly any project, it is impossible to think of locating every insect infested tree. However, this realization must not be used as an outlet for poor work, but as a stimulus for the direction of every effort towards obtaining as near a 100 per cent spotting as is humanly possible to secure. The potential importance of trees missed by spotting crews is often underestimated. Such trees must be viewed in an entirely different light than those isolated individuals occurring in normal or endemic infestations. Trees left during an epidemic have a potential increase of 3 or 5 to 1, while the tree occurring during a normal infestation has but a theoretical ratio of increase of 1 to 1.

In my comments upon the character and the importance of spotting, I wish to be fully understood that there has been no thought of criticism. The above statements have been made for the purpose of emphasizing the importance of this phase of control, as well as to offer what I feel is perhaps the most vital factor in determining the reasons for the variance in the results obtained. When poor spotting did occur, it was a condition that under the existing circumstances, though perhaps foreseen, could not have been avoided. The Coeur d'Alene job was the largest bark beetle control project ever undertaken. It was organized under such severe handicaps as the lack of trained, or competent overhead for camps and spotting crews, difficulties of early spring transportation, and unfavorable weather con-

ditions, that taxed the administrative overhead to their limit. One who was familiar with the project could secure only a favorable reaction as to the efficiency of the project administration.

It is recognized that there is a decided need for more rigid rules relative to the standardization of what are considered at this time as being the best known methods of spotting, treating, camp organization, etc. In the recognition of this need for such standardization, there is no desire to develop it to an extent that independent thought on the part of the officers in charge towards the improvements of the operation is curtailed, but to prevent experimentation with methods already proven to be of no value. It is also recognized that there is a decided need for more adequately trained supervising overhead. Mr. C. S. Webb, who was in charge of last spring's project, fully realizes this need and goes so far as to suggest a well trained spotting crew to supervise and check the results of the various spotting crews.

In summarizing my statements I sincerely believe that the direction of more thought towards the quality of the work being performed will, during the life of a project prove to be a far more economical procedure than the securing of a low cost per tree.

It must be understood that the cost of treatment must always be under consideration and every effort made to reduce the costs of the projects, but not at a sacrifice to the entomological results to be attained. When the factor of insect flight can be eliminated the quality of the spotting and treating within the different units of a project can be taken as a direct measurement of the results that will be attained.

RECOMMENDATIONS FOR CONTROL

The adoption of a plan of control to care for the 1930 infestation on the Coeur d'Alene National Forest has not been an easy task. There is the desire to carry control measures to the extreme of treating all infested trees within the Forest in order to effect a complete clean up, that must be balanced against the economics of covering large areas with spotting and treating crews to secure a few scattered trees. As stated, infested trees remaining after the introduction of control measures must be considered differently from those occurring in normal infestations, as undoubtedly the former have a greater potential power to rebuild the infestation to an epidemic status. However, there is a limit to the extent that one can economically go toward cleaning up the remaining infestation with a follow up or maintenance program of control. It is obvious, of course, that the cost of treating such isolated trees is materially increased. However, though this factor must be considered, it would seem that a decision for the institution of control measures

should be based upon the entomological necessity for the protection of funds already expended. The point or degree of infestation to which an epidemic must be reduced by artificial control before it can be considered as being in a status where natural factors will again establish a balanced environmental condition is difficult to determine. Such a degree of infestation will vary for different areas within the same infestation unit, and could only be determined by a rather detailed study of actual conditions within the areas in question. As these data were not available for the Coeur d'Alene Forest in the establishment of a plan of control, it was necessary to set up an arbitrary degree of infestation below which control measures would not be recommended. It was necessary in several instances to temper this decision with the character of the infestation occurring within the area and by the personal reaction of Mr. Terrell, who was in direct charge of this season's survey. Where the 1930 infested trees were scattered and occurred as single individuals, no control measures were recommended for areas where there were but .05 of a tree per acre, or 32 trees per section. Where the infested trees occurred in groups, or the area in question was immediately adjacent to one where control had been recommended, or if the timber was especially susceptible to insect attacks, control has been recommended for a few areas showing a lighter infestation than .05 of a tree per acre. It is recommended that control measures be instituted in the following areas, and that as near a 100 per cent clean-up as is humanly possible be made of the infested trees within the following units:

Table Showing Areas for which Control is Recommended.

Little River District

Forks	135 Trees	\$ 850
Tom Levin	284 "	1,700
Cascade	287 "	1,700
Picnic	163 "	1,000

Grievly Mountain District

Lower Cougar	150 Trees	900
Upper Cougar	170 "	1,000
Forks Cabin	354 "	2,100
Can Creek	579 "	Treated fall 1930
Clay Creek	150 "	900
Sublette	158 "	1,000

Hager District

Potter Creek	127 Trees	800
Upper Potter Creek	353 "	2,200
Stewart Creek	362 "	2,200

Shoshone District

Blasens	1,100 "	\$7000
Yellowdog R.	366 "	Treated fall 1930
Yellowdog	337 "	" " "
Downey Creek	624 "	" " "
Flat Creek	403 "	2,500
Rock City	235 "	1,300
Cinnamon	155 "	900
Rig Creek (Hawk)	396 "	2,400
Rig Creek (Cabin)	572 "	3,500
		<hr/> 33,050

The above recommendations call for an expenditure in the spring of 1931 of \$33,950, and it is respectfully recommended that funds be appropriated for this purpose.

CONCLUSIONS

It would seem that there is no need to offer an explanation in justification for the expenditure of the funds recommended for this project in 1931. In the spring of 1930 this outbreak was deemed of sufficient importance to warrant the securing of a special appropriation of \$150,000 for its suppression. The justification for such action was based upon the timber values at stake and the rather sound assurance that losses comparable to those which had occurred in other white pine forests of this region would also confront us in the Coeur d'Alene unless prompt action was taken to suppress the pending epidemic. As a result of the control measures instituted an average reduction in the infestation of 74 per cent was secured on all areas treated. When one considers the magnitude of the task which confronted the officers in charge of this project, it would seem that the results attained are above that which should have been expected. A very satisfactory reduction in the infestation has been made and the danger of a destructive epidemic has been temporarily abated. To protect the funds expended and the success already attained it would seem imperative that follow up or maintenance control be instituted in the season of 1931. As this project was of sufficient importance to justify the expenditures of 1930, there can be no question but that the recommendations as made in this report are more than warranted. The importance of this situation cannot be stressed too urgently, and it is urged that the appropriation requested

for the continuance of the Coeur d'Alene project be made for the protection of the timber values at stake as well as the elimination of fire hazards that inevitably increase the difficulty, cost, and danger of fire suppression.

Respectfully submitted,

Assistant Scientific Aid

Entomologist